Optimization of WHIM detection sample

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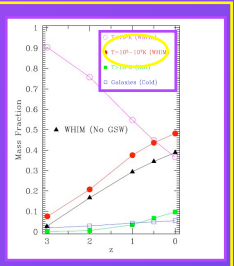
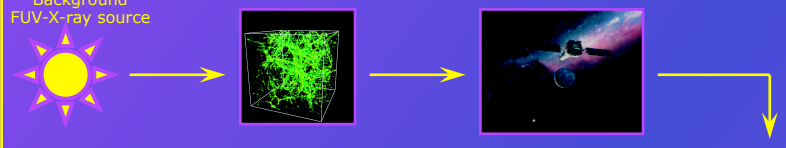
Cosmological simulations imply that ~50% of the baryonic matter in the Local Universe (z<0.5) resides in the filamentary *Warm-Hot Intergalactic Medium* (**WHIM**).

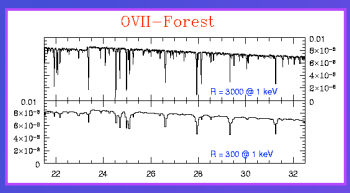


Cen & Ostriker, 2006

Up to now, the search for observational evidences of the WHIM has only produced statistically limited and/or highly controversial results: deep observations of **well-chosen targets** are required.



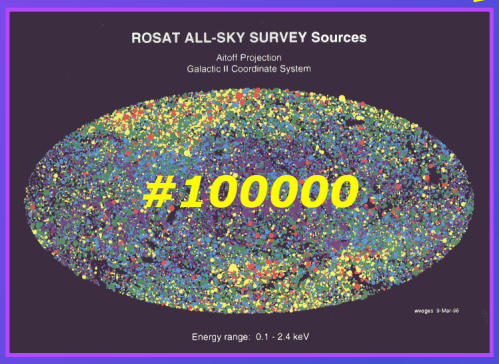
WHIM are extremely tenuous gas (n_b~10^{-6}-10^{-5} cm^{-3}), with low metallicity (Z~0.01-0.1$Z_\odot$), at high temperature (T~10^6 K) and are of relatively small size (0.1-1 Mpc).
Since emissivity scales with the square of the density, observations of the shock-heated and collisionally ionised WHIM in emission are extremely challenging with current instrumentation.



The most promising approach to find out the WHIM is to search for absorption features from the WHIM in **X-ray** and **FUV** in the spectra of bright background AGN.

Selecting the targets

We cross-correlated the 10^5 RASS sources with: (1) the Veron Quasar Catalog giving 3781 objects; (2) the SDSS quasars, 12446 objects; (3) the 6dF Galaxy Survey catalog, 3406 objects; (4) the Sedentary Survey of BL Lacs, 150 objects; (5) and the Multi-Frequency Catalogue of Blazars, 716 objects, giving a total of 20499 ROSAT AGN.



Veron Catalogue (Véron-Cetty et al. 2006) → #3781

SDSS quasars (Anderson et al. 2007) → #12466

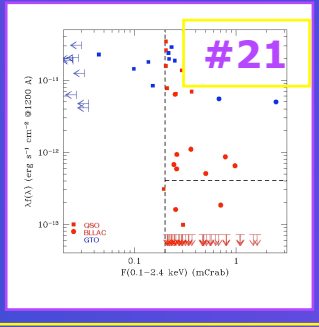
Multifrequency Catalogue of Blazars (Massaro et al. 2007) → #716

6dFGS catalog (Jones et al. 2006) → #3406

Sedentary Survey of BLLacs (Piranomonte et al. 2007) → #150

#20499

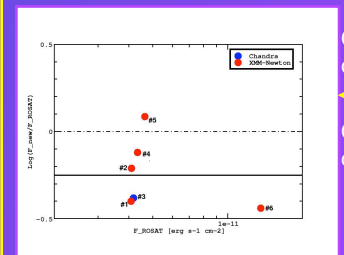
Selecting only those suitable for WHIM observations, i.e. F(0.1−2.4)keV > 0.2 mCrab, z > 0.3 , N_H < 3×10^{20} cm^{-2}, F>3×10^{-13} erg s^{-1} cm^{-2}, at 1200 A, we reduced the number of candidate target to **21 RASS sources (QSO and BlLac)**



The FUV flux selection was made through a cross-correlation with the GALEX survey (Walsh et al. 2005).

Blue target are HST-Cosmic Origin Spectrograph (COS) Guaranteed Time Observation (GTO).

But AGN are variable. To exclude highly variable targets, we compared the 18 year old RASS fluxes with more recent Chandra, XMM-Newton or Swift fluxes



Only **6** are within a factor 3 of their RASS flux

Only **8** have never been re-observed in X-ray.

These **14** (out of 100000) form our best candidate WHIM target sample.